

a multi-signal generator for providing a plurality of signals within a selected frequency band and having a center frequency and a relative frequency spacing of said simultaneous plurality of signals provided by AM and FM band comb frequency generators, wherein divide means 100, mixer 200 and multiply-by-9 in 430 for providing the frequency spacing. The Examiner asserts that Argo discloses a modulator connected to said multi-signal generator for selectively and simultaneously modulating said plurality of signals, i.e., the varactor modulator 390 and the AM modulator 260. The Examiner further argues that Maxwell teaches the center frequency is selectively adjusted to cover at least a portion of the selected frequency band (by DDS 112 and step 304), and teaches a control unit for controlling at least one of the multi-signal generator center frequency and relative frequency spacing by controller 44 at terminal 54, and where the DDS 112' receives the controlling signal 120 from the control block 118. Moreover, the Examiner concludes that it is obvious to one of ordinary skill in the art at the time of invention to modify Argo to include Maxwell's selectively controlling the center frequency and frequency spacing, and that by so doing, Argo's system would flexibly change the center frequency and frequency spacing.

Applicant's brief telephonic interview alerted the Examiner to the structure of Argo whose wideband comb-frequency-generated signals simultaneously covered all of the AM and FM bands, col 4, lines 17-19 and the portion of the band (all of each band in Argo) are defined only by corresponding low- and high-pass filters, col

3, lines 33-35 and col 4, lines 2-4, and that even if a center frequency of the comb signals could be varied as asserted by the Examiner, the resulting AM or FM band coverage portion could not change (in contrast to the claimed structure of claims 1-11) due to the fixed low- and high-pass filters. Applicant now continues, below, to further distinguish the present invention over the cited art and the Examiner's combination.

Applicant first notes that the Examiner has not specified how or where to splice the portions of Maxwell into Argo to "include Maxwell...[into] Argo's system" to form the basis of the rejection under 35 USC 103(a).

Applicant's examination of Argo provides a somewhat different structure than asserted by the Examiner. Applicant notes that on both the AM and FM generators, linear mixers 200, 400 respectively, are used and receive likely substantially pure sine wave modulation signals via the respective band pass filters 160, 440 to modulate the respective fixed carriers. As is well known, when linear mixers receive two input signals, e.g. A and B, by definition provide four, and only four output signals, A, B, A+B and A-B. If we define the RF carrier to be A and the modulating signal to be B, where $B \ll A$, only the carrier A (e.g. 1000 KHz) and the two sidebands, A-B and A+B (e.g. 990 KHz and 1010 KHz) remain, and if the amplitude of A and B are proper only A+B and A-B, not a comb of signals covering either (AM or FM) band. Note Argo's own use of the linear mixer 260 as the audio modulator. Therefore, Argo is inoperative as described, or insufficiently or confusingly disclosed.

Alternately, if a band-wide comb of signals were somehow generated via a linear mixer from filtered (sine wave) signals, Argo does not teach the limitation of (or any adjustment thereof) the extreme high and low frequencies of such a comb signal, save the fixed band-pass filters 220 and 480, col. 5, lines 33-38, each of which include fixed high- and low-pass filters therein. Therefore, one of ordinary skill in the art could only conclude that the "band" of the comb signals generated, if arguably they could be generated, were only defined by band-pass filters 220, 480, and perhaps somehow additionally by fixed equalizers 210, 470.

Regarding Maxwell, Applicant notes that the apparatus taught and/or suggested provides only a single signal rapidly stepped or otherwise varied through the receiver bands, or alternately provides a signal which is difficult to receive in the bands transmitted, or in the further alternative provides a signal if received will be audibly distorted an ineffective in providing the structure and function taught in his patent, discussed more thoroughly in Applicant's prior Amendments, also incorporated here. In essence, Applicant argues that aside from the shifting of the portion of the band in which the signal is generated, when in combination with Argo, Maxwell's rapid stepping of the signal occurs in a manner which interferes with the claimed signal modulation, thus rendering the Examiner's combination clearly unreceiveable and/or inoperative.

By contrast, the present invention according to claim 1, as previously amended, includes:

"a multi-signal generator for simultaneously providing a plurality of signals within a selected frequency band and having a center frequency and relative frequency spacing of said simultaneous plurality of signals, wherein

said center frequency is selectively adjusted to cover at least a portion of the selected frequency band; a modulator connected to said multi-signal generator for selectively and simultaneously modulating said plurality of signals; and

a control unit for selectively controlling at least one of said multi-signal generator center frequency and relative frequency spacing

not found in the cited art of record.

Applicant first argues that Argo is inoperative, or inadequately or confusingly disclosed as the linear mixers 200, 460 cannot provide the comb signals (from the signal at the input) as required by Argo. Secondly, Applicant argues that in view of the multiple cascade of signal generators, filters, mixers, etc. of Argo or Maxwell, it is not obvious at all how or where to add a DDS to or in place of any component in Argo. Thirdly, arguendo, if the 'carrier' signals into Argo's mixers 200, 460 were replaced by the DDS of Maxwell, the resulting signal 'band' would not be changed as Argo teaches that the band limits are determined by the respective fixed high- and low-pass filters, 230, 490 and 240, 500 respectively. Moreover, the respective equalizers 210 and 470 will likely need to somehow (?) be adjusted. Fourthly, as previously argued, the rapid stepping of the signals generated by Maxwell's DDS would render the resulting transmitted signals unreceivable or unintelligible by modern receivers, and is therefor inoperative. Fifthly, there is no disclosure on how to change the relative frequency spacing as claimed. Thus, it is clearly not obvious nor is it ever taught, suggested or disclosed how to combine

into Argo to provide a single functional apparatus, let alone provide the presently claimed invention.

Regarding the rejection of claims 2 and 3, wherein the Examiner asserts that Maxwell's DDS provides said plurality of signals, Applicant notes that the DDS wave in the ROM 204 provides a single frequency only as illustrated in col. 7, lines 13-15, which is serially stepped to another frequency. By contrast, the present claimed invention according to claims 2 and 3 includes "a wave memory for reproducing a selected wave form output signal providing said plurality of signals" not found in the art, either alone or in combination. Thus Maxwell teaches a structure wholly different from the claimed structure.

Further regarding the rejection of claim 3, the Examiner's assertion of a plurality of frequencies generated by Argo, Applicant notes that Argo shows no claimed wave memory.

Regarding the rejection of claim 4, the Examiner's argument that Maxwell's control unit transfers wave forms to the wave memory is clearly without support as the wave ROM is a "READ-only" memory, and Fig. 4 shows only an address input. By contrast, the invention according to claim 4 includes a "control unit [which] provides pre-stored wave forms selectively transferred to said wave memory to provide said plurality of signals on a corresponding portion of said selected band" not found in the cited art, alone or in combination.

Regarding the Examiner's rejection of claims 7-9, Applicant again argues that the Examiner's combination is not possible

(except by undue experimentation), let alone obvious, to provide an operable apparatus as argued above. Applicant further argues that the confusion of the Examiner's combination is exacerbated by a repeated introduction of Maxwell's DDS into Argo in an undefined manner.

The remaining claims dependent on claim 1 provide additional inventive features to further patentably distinguish the claimed invention over the cited art. Applicant therefore believes that the rejection of claims 1-11 under 35 USC 103(a) as being unpatentable over Argo et al. '978 in view of Maxwell '921 is overcome.

Claims 12-16 were rejected under 335 USC 103(a) as being unpatentable over Argo in view of Maxwell and further in view of Wilson '868. With regard to claims 13-16, the Examiner argues that Maxwell shows first and second signal generators having DDS outputs 114 for both the FM and AM band spaced frequencies, the control means 118, the mixer, the power amplifier 132, 162, referring to a plurality of carrier signals from Argo.

Applicant notes that in Maxwell, the disclosure of the signal or signal generation from the DDS to the AM modulator on interface 154 is omitted.

By contrast, the invention according to claim 13, as previously amended, includes:

"a first signal generator for simultaneously providing a plurality of carrier signals within a frequency band and having a relative frequency spacing, and including an amplitude modulator of said plurality of said plurality of signals according to a modulation signal;

a second signal generator for selectively providing a selectable frequency signal, and including a frequency modulator of said selectable frequency according to a

modulation signal;

a mixer receiving the output signals of said first and second signal generators, and providing an output signal;...and

a control means for selectively enabling said first signal amplitude modulator in a first mode, and said second signal generator frequency modulator in a second mode

not found in the cited art of record. Applicant first argues that none of the cited art teaches, discloses or suggests the claimed mixer receiving said output signals as both Argo and Maxwell have separate amplifiers and antennas. The switch 209 in Wilson is not literally the same or equivalent to the claimed mixer. Furthermore, as previously argued, Argo and/or Maxwell, alone or in combination and now Wilson do not teach, suggest or disclose the claimed first signal generator for providing a plurality of carrier signals within a frequency band, or a claimed control means for selectively enabling the first and second modulators.

Regarding the rejection of claim 15, none of the cited art alone or in combination provides, teaches or suggests the claimed "...selected portions substantially comprise said frequency band" for the reasons of non-disclosure, non-obviousness and inoperability discussed, above.

Regarding the rejection of claim 16, wherein:

"said first signal generator comprises means for providing a plurality of signals in at least one selected portion of said frequency band according to said control unit, and

said second signal generator provides said selectable frequency signal according to said control unit,

wherein said mixer output signals comprise selected portions which substantially comprise said frequency band not found in the cited art as the claimed mixer is not taught, discussed or suggested.

The remaining dependent claims 12, 14 and 17 provides additional inventive features to further patentably distinguish the present invention over the cited art of record. Applicant thus believes that the rejection of claims 12-16 under 335 USC 103(a) as being unpatentable over Argon view of Maxwell and Wilson '868 is overcome.

Claims 17-20 were rejected under 35 USC 103(a) as being unpatentable over Argo in view of Hunsinger '396 and further in view of Schlosser '194. The Examiner argues that Hunsinger provides "a sum of sine wave signals each corresponding to one of the set of carrier frequency, dividing the sum, calculating a variance, changing the phase, repeating, transmitting, sum of said sine wave signals, for the AM message, AM LO, the FM message, the output 24 AM over FM." The Examiner further argues that Hunsinger teaches the sum of sine wave signals (with 90 degree phase difference) from local oscillators to mixers 21, 22 as shown in the cover page figure, and that Schlosser teaches the calculating of the amplitude/phase variance for controlling the amplitude and phase using weighting factors deducted from the variance of the amplitude/phase, and further that the summer for summing the weighted signals to produce a final output transform signals with best signal component enhanced. The Examiner argues that it is apparently obvious to include Hunsinger's sum (24) of the sine waves from oscillators with different phases, and Schlosser's weighing factor of the amplitude and phase control using calculated variance from amplitude and phase, to Argo as modified above, such

that the system could be upgraded for controlling the amplitude and phase variations of the summed carriers using the calculated variance. The Examiner also refers to Hunsinger '396 for a teaching of summing into time segment, the summer of Fig. 17.

Applicant notes that Hunsinger AM over FM output (24) consists of only a single carrier, so that the sum at the output of mixer 22 (referenced mixer 21 apparently does not exist) is a sum of two modulated waves of the same carrier. Similarly, the structure of Fig. 4 shows the sum of two modulated (non-sine wave) signals.

As for Schlosser, his signal, like Hunsinger is a single carrier but as 2 quadrature signals X and Y, which are used to continuously calculate the variances of the Amplitude and Phase differences and average amplitude, which are ultimately used to choose from among several signals, col. 3, lines 58-66, col. 8, lines 3-31.

By contrast, the inventive method according to claim 17, comprises the steps of:

- "selecting a set of carrier frequencies;
- providing a corresponding sum of sine wave signals each corresponding to one of the set of carrier frequencies;
- dividing the sum into a number of segments in the time domain;
- calculating a variance of the magnitudes of each said segment;
- changing the phase relationship of said sine wave signals to minimize the variance;
- repeating the steps of calculating and changing until the minimization of the variance from said changes is less than a desired threshold significance value; and
- transmitting a signal corresponding to said sum of said sine wave signals

not found in the cited art of record. Hunsinger teaches or suggests only the summation of two differently modulations of a

carrier, which by definition cannot be the claimed summation of sine wave signals, and thus the Examiner's argument fails. Further regarding the Schlosser's use of the calculated variance to determine weighting factors ultimately used to select one of three signals, Schlosser does not teach nor suggest the claimed steps of changing the phase relationships of the sine wave signals (or step of repeating the steps) since Schlosser discloses no method or means of controlling the phase of the received signals, nor can it change phase of any of the signals, since by definition, the signals are fixed, being a quadrature (90°) pair of a single received signal. Argo makes no contribution to support the Examiner's rejection as Argo's signals are mere comb frequency generations, having no phase measurement or ability to change any one signal without changing all generated signals. Moreover, the Examiner's scheme of somehow integrating Schlosser and Hunsinger and Argo is nowhere taught, suggested or disclosed, and would neither work at all or as claimed, nor could be done without undue experimentation. Any such combination as argued by the Examiner would result in a structure from which the presently claimed invention is instantly and completely patentably distinguishable. Applicant asserts that the cited art does not even mention or has the capacity to implement the steps (e.g. selecting a set of carrier frequencies, changing the phase) as claimed, let alone do so in a manner which teaches, discloses or suggest the claimed invention alone or in combination. Furthermore, the claims dependent on claim 17, now distinguished from the cited art,

provide additional inventive features to further patentably distinguish the present invention over the cited art of record. Applicant therefore believes that the rejection of claims 17-20 under 35 USC 103(a) as being unpatentable over Argo in view of Hunsinger '396 and Schlosser '194 is without support, improper and should be withdrawn, or in the alternative, is overcome.

Claims 21, 22 were rejected under 35 USC 103(a) as being unpatentable over Argo in view of Hunsinger et al '396 and Maxwell. The Examiner argues that Hunsinger claim 21 teaches modulating said signal corresponding to the sum of said sine wave signals, etc. and front figure, abstract, col. 9, lines 54-58 teach simultaneous transmission of AM over FM to the broadcast band using the sum 22 for generating the composite AM over FM signal, and that Maxwell teaches single signal stepping and the generation of various frequencies.

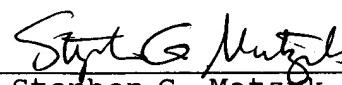
The claimed steps of "modulating said signal corresponding to the sum of said sine wave signals" and "change the phase relationships...) are not taught, discussed or suggested as none of the cited art teaches a summation of sine wave signals nor the adjustment of signal phase relationships, as discussed above. The entire essence of Hunsinger is to be "in-band" and "on-channel" meaning a single broadcast band channel frequency. The entire essence of Argo is to simultaneously cover the entire band selected. Since the cited patents have entirely different structure, methods of operation and outcomes, any combination of the two teachings is fundamentally impossible according to each of

the patents, which cannot be modified to yield an operable combined system. Applicant asserts that the rejection is improper, without support and must be withdrawn. Furthermore, the claims dependent on claim 17 provide additional inventive features to further patentably distinguish the present invention over the cited art of record. Therefore, Applicant believes that the rejection of claims 21, 22 under 35 USC 103(a) as being unpatentable over Argo in view of Hunsinger et al., '396 (and Maxwell) is improper and without support and should be withdrawn, or in the alternative, is overcome.

In each and every Examiner's rejection, above, the Examiner has failed to provide a *prima facia* basis for his rejection. Applicant argues that the rejections are insufficient, improper or inapplicable and should be withdrawn, or in the alternative, are all overcome.

Applicant, having overcome the rejections to the present patent Application, believes that the present application is in condition for allowance. Applicant respectfully requests reconsideration and allowance of the present application. The Examiner is invited to call the Applicant's undersigned attorney should he feel that such a call would further the prosecution of the present application.

Respectfully submitted,
George F. Derome, et al.


By Stephen G. Matzuk, Reg. No. 29,328
P. O. Box 767
Boston, MA 02102
(617) 248 9757
Date 31 Jun 83